Synthesis of New Schiff Base Crown Ethers from Aromatic Diamines, and Study their Complexes with \( C_{60} \)

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Abstract

The reaction of o-2-bromoethoxyanaphthaldehyde (34) with different diamines such as 4,5-dimethylphenelenediamine, o-phenelenediamine, 4-chlorophenelenediamine and 4-methyl phenelenediamine in the presence of potassium carbonate, acetonitrile as a solvent and under nitrogen atmosphere gave a new Schiff base crown ethers namely 5,6,15,16-di(3,4-dimethylbenzo)-11,12,19,20-dinaphthlono-1,10-dioxo-4,7-diaza-14,17-diaminocyclocicosan-13,18-diene (55), 5,6,15,16-dibenzo-11,12,19,20-dinaphthlono-1,10-dioxo-4,7-diaza-14,17-diaminocyclocicosan-13,18-diene (56), cis and trans-5,6,15,16-di(3-chlorobenzo)-11,12,19,20-dinaphthlono-1,10-dioxo-4,7-diaza-14,17-diaminocyclocicosan-13,18-diene (57), (58) and cis and trans-5,6,15,16-di(3-methylbenzo)-11,12,19,20-dinaphthlono-1,10-dioxo-4,7-diaza-14,17-diaminocyclocicosan-13,18-diene (59), (60).

The structures of these compounds were characterized by mass spectroscopy, infrared spectroscopy (IR) and nuclear magnetic resonance (^1H-NMR and ^13C-NMR).

The complexation between [60]Fullerene, and each of the above mentioned compounds was studied in toluene using Uv-Vis. spectrophotometry at room temperature. All Schiff base crown ethers under investigation formed 1:1 complexes with C_{60}, the formation constants K_c were determined by applying the Benesi-Hildebrand equation. The effect of the substituent on crown skeleton is discussed.

Keywords: Schiff base; Crown ether; Fullerenes; Charge transfer; Stability constants.